

**External Panel Review of**  
**“A Plan for Managing Chronic Wasting Disease in Wisconsin:  
The Next Five Years”**

**December 8, 2009**

## Executive Summary

Despite the five-year goals of “minimizing the area affected by the disease and reducing the number of deer infected” (WDNR2009:16), the Plan could easily be interpreted as a CWD monitoring plan, with the additional objective of limiting the spread of the disease to portions of Wisconsin where it does not already occur. This is similar to how several other states are addressing CWD in free-roaming cervids. If this fairly represents what the WDNR and the citizens of the Wisconsin wish to accomplish, then the Plan should be altered to ensure that this is clear. Doing so would require replacing the two overarching goals listed above and removing all text that implies that reducing deer density in the MZ to the “business-as-usual” level chosen by the CWD Stakeholder Advisory Group [SAG (2008)]—and similar to densities present when CWD became established in Wisconsin—would result in biologically meaningful reductions in CWD prevalence or limit the spread of the disease. Once the overarching goals are clarified, text addressing issues such as hunter access to CWD testing, dealing with food pantries, bans on feeding/baiting, CWD surveillance both inside and outside the known endemic areas, proper disposal of carcasses and butcher waste, cervid farms, social surveys, communication strategies, interactions with tribes, CWD research, and potential risks to humans and livestock should be modified as needed to support the new goals. All of these issues fit primarily under the monitoring umbrella. Conversely, the Plan still would require more specifics regarding intensive reductions in deer density associated with CWD clusters along the edges of the known CWD distribution. Similarly, the Plan would need to include verbiage outlining how the WDNR might work with the Illinois DNR to ensure these agencies are not working at cross purposes with each other along the border.

Alternatively, this may not accurately describe what the WDNR and the citizens of the Wisconsin wish to accomplish concerning CWD or, perhaps more likely, there may be a lack of consensus among stakeholders regarding how to proceed. If this is the case, the WDNR may want to consider completing a probabilistic survey of relevant Wisconsin citizens, and perhaps conducting some citizen focus groups, before committing to a course of action. After all, there is no reason to assume that the majority opinion provided by the 17-member SAG (2008) necessarily represents the opinions of the majority of hunters, other wildlife enthusiasts, landowners, or other Wisconsin publics. Should the WDNR make an informed decision to actively and intensively manage CWD within the endemic region, the Plan should include deer density objectives likely to reduce the risk of disease transmission and management actions sufficient to reach these population objectives. Realistically, it is probable that active, intensive CWD management of this type is incompatible with anything resembling traditional recreational hunting and techniques many 21st century Americans may find unpalatable must be considered. Similarly, statutory changes may be required in order to ensure agency employees have access to private lands (as is allowed for law enforcement agents). If various groups of hunters, wildlife enthusiasts, other publics in Wisconsin, and/or the WDNR are unwilling or unable to consider using such techniques, then the Plan goals and objectives should be modified to more accurately reflect agency/public intentions—that is, a monitoring program with plans for intensive reductions in deer density associated with CWD clusters along the edges of the known CWD distribution.

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## Specific Review - Charge

*Review and comment on the following issues:*

- 1. The Plan has a management goal of “minimizing the area affected by the disease and reducing the number of deer infected”. Are the actions outlined in the Plan, including sharpshooting as proposed, appropriate and sufficient to achieve the Plan goal and stated objectives? For actions deemed inadequate, how could they be more effective?*
- 2. CWD is likely to be present on the landscape for a considerable time period. Given that this is an adaptive plan that seeks to respond to changes in scientific knowledge and data, is five years an appropriate timeframe for this management plan and why?*
- 3. Public support is important to the success of any CWD management plan. Are the communication strategies outlined in the plan adequate to achieve that support? If not, what methods, messages and target audiences need to be the priority to maximize that support?*

## Plan Review

Following the 2002 discovery of chronic wasting disease (CWD) in white-tailed deer in Wisconsin, the Wisconsin Department of Natural Resources (WDNR) developed a management plan (Plan) to guide its CWD management activities. The stated goal at that time was to minimize the ecological and socioeconomic effects of CWD, and the goal-specific objectives included: 1) defining the geographic distribution and prevalence of infection, 2) investigating the possible origin of the disease in the state, 3) minimizing the potential spread of CWD to new areas, 4) eradicating the disease in the affected area, 5) enhancing scientific information about the disease, 6) using the best available scientific information to guide management, and 7) providing the public with timely, complete, and accurate information (WDNR 2009:6).

The current draft plan explicitly accepts the presence of a CWD endemic area(s) in south-central and southeastern Wisconsin, and shifts emphasis to prevention of new foci, and spread from existing areas. This is a significant departure from the previous objective (i.e., 4) of eradicating the disease in the affected area. “The new 5-year goal for managing CWD” as outlined in the Plan is “minimizing the area affected by the disease and reducing the number of deer infected” (WDNR 2009:4, 16). “Minimizing the [spatial] area affected by the disease” by definition, implies that area will become no bigger than it is currently. That, in turn, effectively means that this management goal is to prevent further geographic spread of CWD. The Plan essentially states this as an anticipated result (WDNR 2009:22).

For many people, “minimizing the area affected by the disease” implies that, to be successful, CWD management would reduce the spatial area where CWD occurs in Wisconsin such that it asymptotically approaches zero acres over time. This certainly would be a substantive disease management success. Unfortunately, one also could argue that this goal would be successfully achieved if CWD occurred on one less acre than previously. Worse yet, it also is logical to argue that “the area affected by CWD” was successfully “minimized” even if the spatial area where the disease occurs in Wisconsin doubled; after all, it might have tripled without disease management! This goal is a logical tautology as stated; *any* CWD management outcome related to the spatial extent of the CWD endemic area could be declared a success.

Similarly, “reducing the number of deer infected” is far too vague an objective to be useful as the basis for sound environmental policy formation or for underpinning extensive and expensive wildlife disease management. After all, “reducing the number of deer infected” includes every possible outcome between one less CWD infected deer than currently present, and zero CWD infected deer in Wisconsin. For example, if the number of deer in the CWD Management Zone (MZ) was reduced without regard to CWD, the number of CWD infected deer would decrease along with non-infected deer, but the prevalence of the disease would be unchanged. Although this action may be beneficial for a variety of others reasons, it is not disease management.

If minimizing the area affected by the disease and reducing the number of deer infected is to be truly realized then there is insufficient focus in the Plan on broad scale management of the deer population in areas *outside* the MZ.

As difficult as it may be to accept, at this point there is little reason for optimism that the ultimate course of CWD in the current endemic areas can be significantly altered. Indeed, the Plan (WDNR 2009:15) states that “eliminating CWD from Wisconsin is unlikely”. There is clearly theoretical justification for management efforts aimed at the MZ itself, in order to mitigate (to the extent possible) the reservoir of disease in that area and so the reservoir for potential geographic spread to areas outside the MZ. However, analyses of both mule deer in Colorado (Connor and Miller, 2004) and white-tailed deer in Wisconsin (Heisey et al. 2010) suggest that once CWD is established in an area, deer density reductions will not appreciably affect growth rates of the disease. In other words, in the MZ itself, the die has already been cast, and whether herd reductions come as a result of harvest or CWD-associated mortality, they are likely to eventually come one way or another.

While many still question the nature of density-dependent disease transmission of CWD, it is clear that removal of infected individuals reduces risk of transmission to susceptible contacts through direct or indirect routes; fewer infected deer results in fewer prions on the landscape, and consequently less risk for disease transmission. As such, in areas where CWD is already established, there are two significant sources of exposure for uninfected deer: 1) infected deer, and 2) the contaminated environment. It is conceivable that as the environment becomes more and more contaminated by infected deer, it will progressively become the primary source of CWD exposure for any deer present there, however sparsely (or densely) they are distributed. In such a scenario, one would not expect density reductions to appreciably alter the growth rates of disease, because most of the exposure is coming not from other deer, but from the environment. However, in previously uninfected areas, the opposite is likely to be true. Where CWD is not established already, the environment is likely to be comparatively uncontaminated, and therefore not a significant source of exposure for deer. In those areas, the only source of exposure for uninfected deer will then be infected deer. In that situation, increasing density will increase contacts between deer, which will increase CWD transmission, and the growth rate (and subsequent establishment) of the disease. The upshot is that, somewhat counter intuitively, it is likely to be more important to decrease deer densities *outside* the MZ than it is inside of it.

Examination of the WDNR map “comparison of 2009 over-winter deer population estimates to population goals” shows that virtually the entire southern half of the state (south of a line drawn roughly from Green Bay through Eau Claire and on to the Minnesota border) is at least 20% above deer population goals<sup>1</sup>. More than half of that area is outside the MZ, and so would be considered an area where CWD is not yet

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<sup>1</sup>By and large, those population goals are established not with disease control in mind, but rather social carrying capacity, which in Wisconsin is traditionally high, even among groups who suffer the brunt of deer damage (e.g., farmers). Consequently, the extent to which current deer populations exceed densities desirable for prevention of CWD spread is likely to be even greater than the map suggests.

established. Therefore, deer density reductions in that area would be expected to help slow or prevent the geographic spread of CWD to the north. There is an adequate epidemiological basis for implementing measures to facilitate such density reductions. Given that such reductions are most likely to be accomplished through increases in antlerless harvest, and that earn-a-buck regulations were far and away more effective than expanded harvest opportunities at increasing antlerless harvest (Van Deelen et al. in review), there may be adequate justification for expanding earn-a-buck to the entire southern half of the state as defined above.

It is openly recognized that such an expansion will likely be unpopular with hunters, and the anticipated lower deer numbers which hopefully will result will likely be unpopular with the public in general. However, the public in areas outside the MZ cannot be allowed to persist in the mistaken belief that CWD is not their problem, and that management of deer outside the MZ can carry on as usual, as though CWD did not exist and was not a very real threat to the entire state's natural resources, culture and economy. This misconception creates the perfect circumstances for CWD to spread and become an even more onerous problem than it already is, which is difficult to imagine. Moreover, it leads to resentment on the part of hunters in the MZ, who see themselves as being forced to accept management actions to which the rest of the state is not subjected. Over time, that resentment tends to undermine public compliance with other disease management regulations (such as feeding and baiting restrictions, restrictions on carcass movement, restrictions on animal movement by wildlife rehabilitators, etc.) which are difficult, if not impossible, to enforce without public cooperation.

### **Specific Review - Charge**

*1[a]. The Plan has a management goal of “minimizing the area affected by the disease and reducing the number of deer infected”. Are the actions outlined in the Plan, including sharpshooting as proposed, appropriate and sufficient to achieve the Plan goal and stated objectives?*

There are a number of management and monitoring actions outlined in the Plan that seem well conceived and appropriate. For example, continued intensive surveillance in the MZ, continued cooperative working relationships with the Department of Agriculture, Trade and Consumer Protection with regards to the captive cervid industry, banning feeding and baiting, proper disposal of deer parts and carcasses, conducting a third round of surveillance outside the MZ, and employing social surveys to better understand public opinion relevant to CWD management and to gauge the effectiveness of WDNR outreach efforts certainly are laudatory actions.

Many of these efforts, however, are only indirectly related to whether actions outlined in the Plan are sufficient to achieve some measurable degree of “minimizing the area affected by the disease and reducing the number of deer infected”. For example, although CWD surveillance is needed to measure the success of Plan goals, it does not by itself contribute to reducing the “area affected by the disease” or the “number of deer infected”. Unfortunately, there is no reason to assume that actions outlined in the Plan

will result in biologically relevant decreases in the area affected by CWD or the number of deer infected (compared to current values). Further, it is unlikely that these actions will result in even the new, less rigorous, population goals for the Deer Management Units (DMUs) where CWD occurs.

The reasons for these conclusions relate to Objective 3 of the Plan (“Control Distribution and Intensity of CWD”), which states, in part, that: Removing as many deer as possible each year, from infected areas provides the best opportunity for controlling the disease by 1) removing infectious individuals from the population, 2) eventually reducing the number of susceptible animals below the threshold needed for the disease to thrive or persist, and 3) limiting the accumulation of infectious CWD prions in the environment (WDNR 2009:19-20). Based on available knowledge, this statement certainly seems reasonable and appropriate. The Plan (WDNR 2009:22) eventually states that the way the WDNR will determine whether this objective has been realized is that, by 2014:

- 1) The number of infected deer in the MZ has declined.
- 2) The geographic distribution of the disease is not significantly larger than the current known distribution.
- 3) Deer populations in the MZ have been reduced by 40% from the 2008 post hunt population estimate.

Obviously, if the number of deer in the MZ decreases by 40% (or any lesser amount), then the number of CWD infected deer in the region also will decline (i.e., outcome 3 entails outcome 2). However, it is unclear exactly how the WDNR will calculate whether statistically significant changes in the area of CWD endemic region of Wisconsin occurred. Finally, the actions outlined in the Plan will almost certainly fail to result in deer densities similar to those observed in the early 1980s.

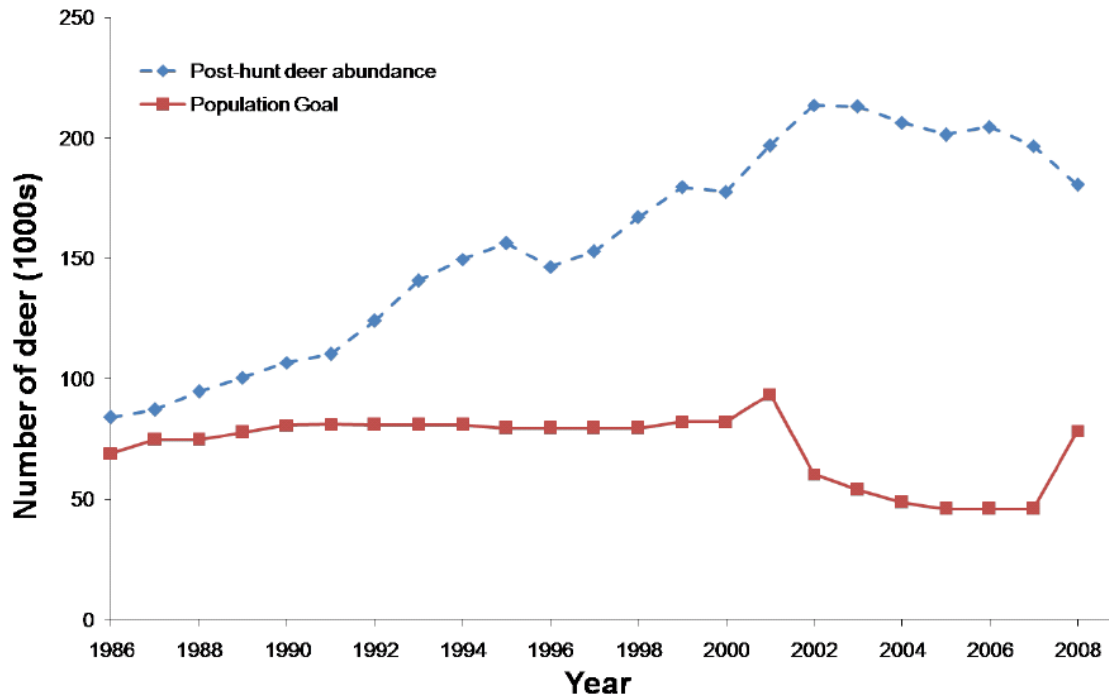
There are two primary reasons why planned actions will not meet the deer density objectives listed in the Plan or alter the risk of CWD transmission in areas of Wisconsin where the disease already is well established. First, the “2008 season structure” will not remove “as many deer as possible” in the MZ. Instead, the population goal for DMUs where CWD occurs as recommended by the SAG (2008) and adopted in the draft Plan (WDNR 2009) (78,458 deer) is *essentially identical* to the average goal in place from 1986 through 1998 for these same DMUs ( $\bar{x} = 78,441$  deer) (Figure 1: WDNR unpublished data).<sup>2</sup>

Whereas a “business as usual” herd goal will undoubtedly be welcomed by many Wisconsin deer hunters, it is difficult to understand how *substantially decreasing* the harvest objective will result in *substantially increasing* the number of deer harvested. Specifically, while actions in place since 2002 may have ended the exponential increase in deer numbers in the DMUs where CWD occurs (Figure 1), there is no reason to

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<sup>2</sup> Data for these population goals include all of DMUs 54B, 73B, and 77C to enable continuity with previous data [the 2001 and SAG (i.e., 2008) goals listed in the draft CWD Management Plan (WDNR 2009:30,35) include only the portions of these three DMUs within the MZ].





**Figure 1.** White-tailed deer population goals and estimated post-hunt deer abundance in Wisconsin Deer Management Units affected by chronic wasting disease, 1986–2008 (Wisconsin Department of Natural Resources, unpublished data).<sup>3</sup>

assume that tweaking these same actions, as proposed in the Plan, will lead to substantially fewer deer in this region and thence achieve even the new less rigorous population goals.

A second much more serious issue that there is no epidemiological reason to assume that even if the new deer density goal for the MZ is reached (i.e.,  $\bar{x} = 18.6$  deer/mile<sup>2</sup>) that a biologically significant decrease in CWD preference or contraction in the area of where CWD occurs in Wisconsin would result. Although the epidemiology of CWD in free-ranging cervids is poorly understood, we do know that: direct CWD transmission among deer via saliva and other body fluids occurs (Mathiason et al. 2006), and cervids also contract the disease via rather persistent environmental contamination, at least when they occur at relatively high densities (Miller et al. 2004; 2006). Conner et al. (2007), however, found that efforts to manipulate mule deer (*O. hemionus*) density did not produce any measureable changes in CWD prevalence, although they maintained that lack of data and time limited statistical power of their analysis. The point is that, it is unclear to what non-zero value (if any) deer density must fall before CWD transmission rates decline within areas where the disease is already well established. Regardless, CWD persists in white-tailed deer populations elsewhere in the United States where deer densities are far below the objective listed in the draft Plan (e.g., western Nebraska,

<sup>3</sup> Data for population goals and post-hunt abundance include all of DMUs 54B, 73B, and 77C to enable continuity with previous data [the 2001 and SAG (i.e., 2008) goals listed in the draft CWD Management Plan (WDNR 2009:30, 35) include only the portions of these three DMUs within the MZ].

eastern Wyoming), so there is no reason to assume that  $\sim 19/\text{mile}^2$  is below or even near the CWD transmission threshold. Similarly, current epidemiological data suggest CWD became established in two separate locations in Wisconsin >20 years ago (WDNR 2009:12-13), so as Figure 1 illustrates, post-hunt deer abundance at the new population goal would be quite similar to that observed when the disease became established in the state. For all these reasons, it is highly unlikely that the changes in deer density proposed by the plan, assuming they can even be achieved under the actions outlined in the Plan, will measurably alter CWD transmission in areas where the disease already occurs.

Heisey et al. (2010), using Wisconsin data, confirmed that CWD prevalence may not be directly related to risk of CWD transmission within an area where numerous deer already are infected, at least at the range of deer densities documented in the MZ. They did find, however, that CWD prevalence would be expected to greatly influence how easily the disease spreads to areas where it does not already occur. This research supports the Plan's objective to substantively reduce deer density by "conduct[ing] focused sharpshooting on public and private lands where permission can be obtained in areas of disease clusters along the edges of the known CWD distribution" (WDNR 2009:21).

Evidence from jurisdictions that apply some form of narrow targeted response in the vicinity of known CWD cases, situations of high deer density, and/or local populations protected from hunting pressure clearly shows that targeted removals are the best tool currently available for reducing the risk of transmission. This result is fully consistent with mounting evidence that transmission of CWD occurs locally in relatively small home ranges, occurs extensively within matrilineal groups, and builds slowly from point sources. All of these factors speak in favor of focused removals as a key tool in finding and removing infected individuals and thus affecting transmission rates.

The question is how much removal is necessary to have a measurable impact on the dynamics of CWD (either in stamping-out new foci or reducing spread from and in affected areas)? Simply put, no-one knows; however, from a theoretical perspective there is reason to believe that geographic- (i.e., areas of higher prevalence) and demographic- (i.e., sex/age classes with higher prevalence) targeted culling (e.g., sharpshooting) is likely to lead to reduced transmission of CWD. Furthermore, while the jury is still out on the nature of density-dependence in CWD transmission, it is a logical assumption that reducing deer densities will lead to reduced opportunities for disease transmission. Therefore, if the deer density surrounding disease clusters along the edges of the known CWD distribution is reduced sufficiently, this objective has the potential to measurably reduce the rate that CWD expands into areas where it did not occur previously and is a worthwhile objective. It seems certain that agency sharpshooters would be required to effectively and consistently address this objective.

The Plan proposes to consult with "local citizens and the Conservation Congress to develop a sharpshooting plan" (WDNR 2009:19) which will "then be presented to the Natural Resources Board (NRB) for approval, prior to deploying sharpshooters". If the NRB process requires a public comment period as well, implementation time will be

further delayed. Even though the Plan is firmly based on a consultative approach, which can be good, the Plan does not contain sufficient assurance that the tool of focused removals will be applied in all appropriate situations. The nucleus of the consultation should be that sharpshooting is essential to achieving the program goal and the local discussions around sharpshooting should be how to conduct activities, not whether to conduct them.

*1[b]. For actions deemed inadequate, how could they be more effective?*

If decreasing deer density across the MZ remains an aspect of the final CWD Management Plan, the WDNR should abandon the ~19 deer/mile<sup>2</sup> objective and consider alternatives such as setting a given percentage decrease in post-hunt deer numbers annually (i.e., steady annual decline) for each DMU within the MZ. As Figure 1 illustrates, there may have been a slight annual decline in post-hunt deer abundance in the MZ during most years since 2002 (one cannot be certain whether these values are significantly different statistically because confidence intervals for these estimates were not provided by the WDNR). Regardless, this apparent decline could be used to inform initial values for the desired goal for each DMU where CWD occurs. Management actions and future herd goals then could be altered adaptively based on data collected over subsequent years.

The Plan should include the distance surrounding each CWD cluster “along the edges of the known CWD distribution” where intensive deer density reductions will take place (WDNR 2009:21). It also should include the target deer density for these zones, the number of years deer density will be held at target levels, and exactly how the WDNR will determine whether these objectives are met. Further, the NRB may want to consider seeking statutory authority that would expedite access to private properties if necessary to enable intensive reduction of deer density at, or surrounding, CWD clusters along the edges of the known CWD distribution.

While the previous paragraph dealt with epidemiological boundaries, political boundaries also are important to CWD management. As Figure 4 (WDNR 2009:12) in the Plan illustrates, the political boundary between Wisconsin and Illinois has nothing to do with epidemiological boundaries. The success of CWD management in southeastern Wisconsin hinges on CWD management success in northern Illinois, and vice versa, as stated in the Plan (WDNR 2009:13). For this reason, it seems logical that the Plan should include a mechanism for collaborating with the Illinois DNR toward achieving compatible CWD management objectives and actions relevant to their shared boarder.

*2. CWD is likely to be present on the landscape for a considerable time period. Given that this is an adaptive plan that seeks to respond to changes in scientific knowledge and data, is five years an appropriate timeframe for this management plan and why?*

The most fundamental factor driving how a disease is managed must inevitably be the biology and epidemiology of the disease itself. There is both scientific consensus and abundant empirical evidence from both controlled experiments and the field that CWD,

as the name suggests, is a *chronic* disease, with a protracted course. Due to the chronic nature and slow progression of CWD, environmental contamination related to the disease, and the fact that deer density and harvest estimates are made annually, five years is far too short a timeframe for effective adaptive management targeting CWD in free-roaming white-tailed deer. Although education, communication, and public relations campaigns, and possibly even scientific breakthroughs, may occur more quickly, it is likely that a minimum of 3–5 years using a given management approach will be required before the WDNR could evaluate the success of the approach and consider alternatives if needed. It is unreasonable to adopt an adaptive resource management plan that is likely to include time for only one corrective, and no time to see the corrective's results.

The Plan (WDNR 2009:7) assumes that “success of CWD management techniques cannot be measured over a few years.” It goes on to state (WDNR 2009:16) that “Ultimately, assessment of the effectiveness of control actions for CWD must be based primarily on documentation of changes in the prevalence and geographic distribution of the disease. Because CWD is a slowly progressive disease, significant changes in distribution and prevalence in free-ranging deer populations will likely occur over a protracted time scale.” The minimum incubation period is 18 months, and no upper limit on incubation has yet been established. Consequently, a five year management plan will encompass a maximum of three transmission cycles, possibly fewer. Moreover, the Plan provides for (WDNR 2009:21) review and possible alteration of control strategies after next year (a maximum of one transmission cycle). While it is recognized that WDNR wants to accommodate the public's input on the Plan, it will be nearly impossible epidemiologically to demonstrate either the success or failure of prescribed CWD management actions in that short time frame. Therefore, those attempting to manage CWD in free-roaming cervid populations probably need to begin thinking in terms of decades rather than years; 20 or even 30 years is a more reasonable timeframe for adaptively managing CWD in free-roaming deer. It would be reasonable, however, to use shorter timeframes for CWD-related education, communication, or public relations campaigns. Similarly, if the WDNR chooses a 20-year timeframe, it may be reasonable to require a major reevaluation after 10 years.

*3[a]. Public support is important to the success of any CWD management plan. Are the communication strategies outlined in the plan adequate to achieve that support?*

Under Objective 4, “Increase Public Recognition and Understanding of CWD Risks”, the draft Plan (WDNR 2009:24) provides the following action to reach this objective: Use survey data to better understand public opinions about CWD management and to develop, test, and refine messages and delivery mechanisms that enhance public support for CWD management. Use research to identify barriers to harvesting more deer and allowing access to land for deer removal and to develop a communication strategy to reduce those barriers.

The WDNR anticipates that it will have developed, tested, refined, and implemented “communication strategies to increase support among hunters, the general public, and decision makers for the state's approach to CWD management” by 2014

(WDNR 2009:24), the same year all other plan goals are to have been achieved. A CWD communication strategy, no matter how excellent, is of little value if it comes on line the same date disease management is to have been completed. As the Plan states (WDNR 2009:23), “substantial changes in public attitudes toward CWD and its management will take time, perhaps best measured by generations”, which further supports the contention that 5 years is far too short a timeframe for an adaptive management plan for CWD in free-roaming deer.

Regardless of the time issue, the Plan (WDNR 2009:24) still falls short in addressing exactly what sort of “survey data” will be used to “develop, test, and refine messages and delivery mechanisms that enhance public support for CWD management”, and specifically how these messages and delivery mechanisms will be tested and refined. The anticipated results of the Plan (WDNR 2009:24) appears to imply that communication success will be measured by long-term targets such as “a steady (annual) decline” in deer numbers, increasing “percentage of landowners granting access to their land for deer removal”, and “hunter effort” increasing as deer abundance decreases. These long-term goals are not useful for modifying and perfecting communication strategies. Instead, data regarding changes in hunters’ or landowners’ behaviors that would eventually lead to these long-term goals are needed. Although this section of the Plan (WDNR 2009:22-24) mentions results from Petchenik’s (2006) survey, additional survey efforts undoubtedly will be required. The study population Petchenik (2006:9) addressed “consisted of 8,000 individuals owning a minimum of five acres in the southwest DEZ.” The DEZ was in the southwestern portion of Wisconsin (Petchenik 2006:50) and did not include the remainder of the southwestern endemic area or the CWD endemic zone now recognized in the southeastern portion of the state (WDNR 2009:12). Petchenik (2006:9) mailed the survey to a random sample of 1,000 of the 8,000 landowners that met study criteria in the DEZ between 1 October and 12 November 2004, so data obtained addressed the 2003 hunting season and landowner attitudes in late 2004. As noted above, this survey *did not* include landowners in the southeastern CWD endemic area, those who hunted in the DEZ but did not own land there, landowners and hunters elsewhere in the state, and other citizens of Wisconsin. Moreover, with a disease such as CWD, one would assume that the opinions of landowners within the DEZ may well have changed since 2004.

The text associated with Objective 4 (WDNR 2009:22-24) seems to imply that the WDNR perceives communication to be primarily a one-way street leading from WDNR employees to various Wisconsin publics. For example, the first anticipated result in this section of the Plan is that “communication strategies to increase support among hunters, the general public, and decision makers for the *state’s approach* to CWD management have been developed and are being implemented” by 2014 (WDNR 2009:24). The Plan does not state how the “state’s approach to CWD management” will be altered by direct public input, but this undoubtedly will occur. Employees of the WDNR could learn much more from the public than simply their opinions regarding a set of survey questions if given the opportunity.

That WDNR should continue to work to understand public perceptions of CWD and its management, and maximize public support for agency actions is not in dispute. However, it is also important to recognize that consensus support for agency policies on CWD (or virtually any other issue) may never be attained. No matter what outreach and education efforts are undertaken and no matter how diligently they are pursued, there will always be a segment of the population that has simply “made up its mind” already and is not receptive to any message which conflicts with its established viewpoint. However, that fact, coupled with the reality that natural resource agencies manage wildlife in trust for the public, may mean that at some point the agency may simply not have the backing necessary to accomplish its management objectives.

Regardless, it is heartening to see that a “do nothing” approach is simply not acceptable in Wisconsin. Yes, we may all learn to live with CWD but we do not have to live with its uncontrolled growth in geographic and numerical distribution. The current toolbox available to limit spread and prevalence of CWD is quite limited, but can and should be applied aggressively until better tools are available. Such a program is fully consistent with wise stewardship of a significant natural resource (free-ranging deer) and protection of a keystone economic, social, and cultural resource.

Finally, WDNR employees, NRB members, and others involved with reformulating WDNR’s CWD management policy undoubtedly are keenly interested in making the best decisions possible for the resource and their constituencies. Similarly, those who initially drafted the CWD Management Plan assumed that management actions outlined therein would lead to significant changes in the CWD situation in Wisconsin. The question that needs to be addressed is to what degree these “significant” changes refer to statistically, biologically, versus socially significant differences. As Morrison et al. (2008:27-28) argued, not all socially important issues matter biologically (and vice versa), and not all statistically significant differences are relevant biologically or socially. As the CWD Management Plan is reconsidered, those involved in reexamining goals and actions should explicitly determine to what degree they are addressing statistically, biologically, and socially significant changes related to CWD in Wisconsin.

*3[b]. If not, what methods, messages and target audiences need to be the priority to maximize that support?*

More up-to-date social survey data addressing a wider array of stakeholders than those surveyed by Petchenik (2006) is needed to inform effective public outreach programs associated with CWD management in Wisconsin. One could argue that recreational hunting and effective CWD management are incompatible goals. For this reason, if no other, the WDNR needs to know whether there is support not only among different groups of hunters and landowners, but also among the public at large for management approaches that could dramatically reduce deer density. For example, eradication of foot and mouth disease in black-tailed deer (*O. h. columbianus*) in the Stanislaus National Forest of California during the 1920s demonstrated that massive decreases in the density of deer inhabiting much more formidable terrain than that in southern Wisconsin are indeed physically possible (Keane 1926). The problem is that

techniques required for such reductions, such as a year-round open season with no bag limit, pursuit with dogs, nighttime sharpshooting, sharpshooting over bait during winter, snaring, trapping, and helicopter gunning are not particularly palatable for many 21st century Americans. Those responsible for CWD management in Wisconsin may learn via a new survey that the public will not support *any* approach that would have any reasonable chance of reducing deer densities across the entire MZ sufficiently to impede CWD transmission. Administrators need access to such information prior to implementing massive and expensive disease management plans (Heberlein 2004).

The Plan should include specifics regarding which Wisconsin publics will be targeted by surveys, how communication strategies will be developed, tested, and refined, and how various delivery mechanism will be evaluated. Although long-term goals such as “a steady (annual) decline” in deer numbers, increasing “percentage of landowners granting access to their land for deer removal”, and “hunter effort” increasing as deer abundance decreases are fine, more short-term data on relevant changes in targeted behaviors are needed. Additionally, strategies for learning from the public should be explicitly addressed in the Plan. For example, scoping meetings and the strategic use of focus groups could be quite helpful. The WDNR needs to learn more from hunters and other groups than just their opinions regarding a list of survey options.

On a fundamental level, the public will ultimately decide, for better or worse, what eventually will be done with CWD in Wisconsin. If the public is unwilling to make the sacrifices necessary in the present to prevent the disease from spreading and the outbreak from growing, then their children will have to deal with the consequences. The WDNR must accept the possibility that no matter what they do or how well they do it, the public may decide that having abundant deer in the short term is more important to them than having healthy abundant deer for the sustainable use of future generations. If that happens, it will not be WDNR who have failed as stewards of the resource, but the people of Wisconsin.

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